DEFENSE ADVANCED RESEARCH PROJECTS AGENCY
DEFENSE SCIENCES OFFICE (DSO)
PLANNED PROCUREMENTS
October 1997

PROGRAM DESCRIPTION	FUNDING	SCHEDULE	PROGRAM MGR
Solid Freeform Fabrication and Design: The Solid Freeform Fabrication (SFF) Program is currently developing machine capabilities to convert virtual objects (e.g., CAD files) directly to components with form, fit and function. Future efforts are expected to extend machine capabilities to new materials and combinations of materials; improve dimensional tolerance and surface finish; extend machine capabilities to nonplanar build layers; develop machine capability for positional control of composition or crystal texture; develop novel methods to facilitate the sharing and exchange of key material and SFF process information and knowledge, supporting engineers in identifying alternative designs; and extend the capability of manufacturing systems to utilize product performance information in planning and defining the SFF process. System demonstrations are expected to utilize the developed machine capabilities to optimize both design and materials. Demonstrations of novel concepts in support of advanced gas turbine engine technology are of particular interest, although other novel applications are encouraged. In most cases, teams with expertise in system integration and design optimization, machine design and process control, and materials science and engineering will be required to execute such programs.	$8M	BAA 97-35 Proposals due 10/17/97 Total program: 2 years	Dr. William S. Coblenz Mr. Kevin Lyons DSO
Virtual Integrated Prototyping of Thin Film Vapor Phase Deposition: This program seeks to develop methodologies for optimizing manufacturing processes using computational simulation that integrates process physics and chemistry and effectively captures the science of vapor deposited film growth. This will enable the innovative design and optimization of reactors with sufficient actuation, sensing, and advanced control to maintain process variables and product qualities within the performance range required for economically successful production.	$12M	BAA 97-36 Proposals due 10/31/97 Total program: 3 years	Dr. Anna Tsao DSO

PROGRAM DESCRIPTION	FUNDING	SCHEDULE	PROGRAM MGR
Crystal Growth: The goal of this program is to develop techniques for growing device-quality, thin, single-crystal films on amorphous and/or lattice-matched substrates for three-dimensional integration of semiconductor devices and devices composed of multiple materials. The techniques of interest should be flexible in respect to lattice spacing and crystal orientation, and be scaleable to wafer size areas.	$8M	BAA 97-40 Proposals due 11/14/97 Total program: 3 years	Dr. William S. Coblenz DSO
Energy Harvesting: The environment offers a wide variety of energy sources that can be exploited to provide power on a continuous basis. The low specific power and sometimes intermittent nature of these sources presents a major challenge for their use, however. Many DoD and commercial applications have power requirements that fall within the range of energy harvesting, (e.g., < 1 watt for most of their duty cycle) with pulse capability in the 1-5 watt range. While it may not be possible to generate power levels in the latter range using compact energy-harvesting concepts alone, a systems approach that includes energy harvesting, power conversion, and storage that is carefully matched to the required duty cycle could reduce or eliminate the need for power source replacement in devices such as unattended sensors or micro-robots. This program will focus on innovative concepts for energy harvesting and their integration into useful systems. Approaches include, but are not limited to: biological fuel cells (including compact biological fuel reformers), mechanical transduction (e.g., vibration, water and wind movement, human motion), novel and efficient means to harvest chemical and thermal gradients, and electromagnetic radiation. The program will provide opportunities for the exploration of novel energy-harvesting concepts as well as the development of complete integrated systems. Routine packaging of existing, off-the-shelf components will not be of interest for this program; however, novel fabrication approaches that could produce compact, integrated systems will be considered.	$25M	BAA 97-44 Proposals due 12/11/97 Total program: 4 years	Dr. Robert J. Nowak DSO

PROGRAM DESCRIPTION	FUNDING	SCHEDULE	PROGRAM MGR
Frequency Agile Materials for Electronics (FAME): The goal of this program is to discover, develop, and exploit novel materials and device concepts for frequency agile components for advanced electronic applications. These might include filters, oscillators, phase shifters, circulators and antennas that, for example, are tuned by changes in the permeability and permitivity by applying varying magnetic and/or electric fields. Other innovative concepts for frequency agility will also be considered in this program. These devices will provide new capabilities for defense systems in communications, electronic warfare, remote sensing and surveillance with significantly reduced size and cost. They will add significantly to the capability of very small platforms. The program will most likely be carried out by multidisciplinary teams with expertise in materials, materials processing, device design and defense system requirements.	$25M	BAA 97-34 Proposals due 10/1/97 Total Program: 4 years	Dr. Stuart A. Wolf, Dr. Francis W. Patten DSO
Single Crystal Piezoelectrics for Electromechanical Transduction: This program exploits recent research results demonstrating that single crystals of relaxor piezoelectrics exhibit electromechanical coupling exceeding 90% (compared to about 75% in conventional piezoceramics) and strain levels exceeding 1% (compared to about 0.1% in conventional piezoceramics), providing thereby a quantum enhancement in solid state electromechanical actuator performance. The initial phase of 2-3 year projects will concentrate on devising innovative growth methods, understanding microscopic origins and optimizing composition, properties, and processing, and identifying and demonstrating -- on laboratory scale -- materials performance in applications addressable with initially produced samples. A second phase of 2-3 year projects will scale up materials production methods and demonstrate performance in selected high-impact defense applications ranging from helicopter rotor control, through wing shape control, to naval sonar systems.	$30M	BAA 1QFY98 Total program: 4-5 years	Dr. Wallace Smith DSO

PROGRAM DESCRIPTION	FUNDING	SCHEDULE	PROGRAM MGR
Tissue Based Biosensor for Biological Warfare/Chemical Warfare Detection: This program seeks to develop multifunctional physiological bioassay system(s) utilizing individual and multicellular arrays providing early warning for chemical and biological agents such as toxins, nerve agents, bioregulators and other chemicals. A key to the use of cellular arrays is the identification of active vs. inactive agents and their effects on human performance. The goals of this effort are to provide military personnel with advanced warning of active agent exposure and to provide assessment of decontamination activities.	$10M	BAA 1QFY98 Total Program: 4 years	Dr. Alan Rudolph DSO
Electroactive Polymers: Recent discoveries have shown that various electroactive polymers may be combined to produce materials with useful electronic, optical, and mechanical responses. These materials may be integrated into systems to provide unique functionalities such as muscle actuation, optical flow data processing, and other system capabilities of use to the DoD. Of interest will be materials synthesis -- develop and demonstrate techniques to synthesize electroactive polymer materials in required forms; material characterization -- characterize material response to external stimuli, such as mechanical optical, electrical, chemical, and temperature; and device development -- fabricate and evaluate devices for demonstration (e.g., plastic retinas, artificial muscles, and electromagnetic signature control).	$25M	BAA 2QFY98 Total program: 4 years	Dr. Robert Crowe Dr. Francis W. Patten Dr. Dennis M. Healy, Jr. DSO
Biomimetic Systems: This program will identify and then mimic functional (as opposed to structural) biological systems that show superior performance compared to conventional abiotic approaches. Projects will involve the construction of prototype platforms that demonstrate superior mobility on land, in water and under high surge (littoral zone) environments. Other candidate systems to be evaluated include (but are not limited to) active camouflage, optical/infrared/acoustic detection, resonant insect flight, skin and bone healing or limb regeneration (e.g., as in amphibians), and extremophile strategies used by small invertebrates. Prototypes of biomimetic systems will be developed that will demonstrate enhanced capabilities for Defense operations including sensing, surveillance, and mine countermeasures.	$20M	BAA 2QFY98 Total program: 4 years	Dr. Alan Rudolph DSO

PROGRAM DESCRIPTION	FUNDING	SCHEDULE	PROGRAM MGR
Controlled Biological Systems: Living biological systems have extremely complex and unique capabilities and interactions with their environment that would be extremely valuable to capture for Defense applications if these capabilities could be mimicked, controlled, or influenced. The goal of this program is to develop biological systems as platforms for identification, sensing, reporting, and countermeasure delivery in Defense applications. Emphasis will be on controlling biological systems through physical, chemical and biological effects. Efforts will also include investigation of the control of biological systems by abiotic methods. These efforts will include control of gross motor function through physical stimuli, heat, gross neuronal stimulation and sensory modulation; release of local chemical stimuli in a directional manner; the attachment of sensor suites to trained biological systems; and the incorporation of controlling materials and/or devices.	$20M	BAA 2QFY98 Total program: 5 years	Dr. Alan Rudolph DSO
Optimized Portable Application Libraries/Materials Process Stimulation: This program is aimed at the development and application of methodologies for automated generation of high-performance, scalable codes for critical computational kernels. Approaches of interest should allow explicit mathematical expression and manipulation of application- and architecture-dependent features of algorithms that impact runtime performance for broad classes of architectures and applications. Of particular interest are critical computational kernels having pervasive impact and general applicability in a broad variety of materials processing and other DoD-relevant simulation technologies, such as mesh generation and front capturing.	$5M combined DARPA and NSF funding	NSF BAA 2QFY98 Total program: 3 years	Dr. Anna Tsao DSO
Unconventional Pathogen Countermeasures: The purpose of this program is to develop and demonstrate defensive technologies which afford the greatest protection to uniformed warfighters, and the defense personnel who support them, during US military operations. Ideally, these defenses will be instantly available or emplaced countermeasures that can defeat biological threats as they enter the body and before they reach and attack target cells and tissues. The focus of this program is to develop revolutionary, broad-spectrum, medical countermeasures against significantly pathogenic micro-organisms and/or their pathogenic products. These countermeasures will be versatile enough to eliminate biological threats, whether from natural sources or modified through bio-engineering or other manipulation.	$25M	BAA 2 or 3QFY98 Total program: 3 years	CDR Shaun Jones DSO

PROGRAM DESCRIPTION	FUNDING	SCHEDULE	PROGRAM MGR
Advanced Diagnostics: The objective of this program is to provide the capability to detect in clinical samples or in the body, in real time and in the absence of recognizable signs and symptoms (e.g., when pathogen numbers are still low), the presence of infection by any pathogen. Specific areas of interest include but are not limited to: (1) multi-agent diagnostics capable of simultaneously identifying a broad range of pathogens (infectious agents and/or their products); (2) strategies for identifying both known and presently unknown or bio-engineered pathogens (e.g., diagnostic approaches based upon fundamental, critical mechanisms of pathogenesis, targets shared by classes of pathogens, or early host responses to infection); (3) capabilities for continuous monitoring of immediate recognition of infection in the body; and (4) wearable diagnostics for noninvasive, broad-spectrum detection of infection in the body.	$10M	BAA 2 or 3QFY98 Total program: 3 years	Dr. Stephen S. Morse DSO

DEFENSE ADVANCED RESEARCH PROJECTS AGENCY
ELECTRONICS TECHNOLOGY OFFICE (ETO)
PLANNED PROCUREMENTS
October 1997

PROGRAM DESCRIPTION	FUNDING	SCHEDULE	PROGRAM MGR
Microelectromechanical Systems (MEMS): The long-term goal of the MEMS Program is to combine sensing, computing, and actuating and integrate these functions into mechanical structures to radically change the way people and machines interact with the physical world. Military information systems are tending to leave command centers and appear both in weapons and in the pockets of the combatants. Thus, they are getting closer to the physical world and this trend creates new opportunities for perceiving and controlling the battlefield environment. Further demands for increased performance, reliability, robustness, lifetime, maintainability and capability of military equipment of all kinds can be met by the integration of MEMS into macro devices and systems. Proposals are sought in two broad technology areas: (1) development and demonstration of arrays of MEMS including, but not limited to, wristwatch communications, arrays for vehicle or macro system monitoring and/or control, and micro airborne surveillance/communication; and (2) manufacturing resources for innovative new MEMS including, but not limited to, process disintegration, massively parallel microassembly, non-silicon substrates, and fully three-dimensional structures.	$25M	BAA 1QFY98 Total program: 3-4 years	Dr. Albert P. Pisano ETO
VLSI Photonics: To develop and demonstrate VLSI-level photonics with >10,000 elements of optical sources, detectors, and electronics (smart pixels) with >10 Tbps reconfigurable I/O capability at the chip/MCM level (scale of mm's to cm's). Demonstrate the feasibility of >100 to 1000 times reduction in power*volume in implementing SAR/ATR by exploiting VLSI photonics and free-space optical transforms. Multiple BAAs planned.	$35M	BAA 97-38 Proposals due 11/24/97 Total program: 3 years	Dr. Elias Towe ETO

PROGRAM DESCRIPTION	FUNDING	SCHEDULE	PROGRAM MGR
Microfluidic Molecular Systems: To develop and demonstrate new microfluidic technologies and integrated microfluidic systems for reaction, synthesis and detection. Focus is on the automation and integration of complex protocols in highly integrated systems to achieve orders of magnitude increases in functionality per area.	$10M	BAA 97-39 Proposals due 11/7/97 Total program: 2 years	Dr. Rose Ritts ETO
Distributed Robotics: The DARPA Distributed Robotics Program seeks to develop revolutionary approaches to extremely small robots, reconfigurable robots, systems of robots, biologically inspired designs, innovative methods of robot control including innovative interfaces, and methods of implementing pooled capabilities and/or layered intelligence. Part of the challenge is in striking the right balance between individual robot capability and pooled or multiple robot capability, and between individual robot intelligence and layered system intelligence. Another challenge involves the development of architectures, control functions, interface approaches and physical mechanisms that allow unit modules to dynamically and automatically configure themselves into a more complex robot. The configuration or reconfiguration process would be initiated in response to a need to overcome environmental obstacles or in response to varying mission requirements. For the purposes of this solicitation, individual robots are less than 5 centimeters in any dimension; however, novel methods of long-range deployment may involve larger transport vessels. DARPA seeks innovative proposals in the following areas: (1) enabling robot technology; and (2) distributed robot systems.	$25M	BAA 97-41 Proposals due 10/24/97 Total program: 3 years	Mr. Ellison Urban ETO Dr. Regina Dugan DSO
Design for Mixed Technology Integration (Composite CAD): To invent new design technology to exploit mixing analog, digital and MEMS (optical or fluidic processing; mechanical sensors or actuators) on single, monolithic substrates with a focus here on fluidic modeling and integration of newly developed tools.	$15M	BAA 97-39 Proposals due 11/7/97 Total program: 3 years	Dr. Rose Ritts ETO

PROGRAM DESCRIPTION	FUNDING	SCHEDULE	PROGRAM MGR
Sonoelectronics: This program will develop a new class of acoustic transducers and acoustomechanical amplifiers for underwater ultrasonic sensing. The transducers will be made by surface micromachining in silicon and are expected to perform with better sensitivity than piezoelectric transducers operating around 1 MHz. They will also be highly integrable with Si CMOS readout electronics over large wafer areas (up to 8-in. diam.), leading to the fabrication of large transducer arrays directly coupled to low-noise buffer amplifiers and analog-to-digital converters in each pixel. The key deliverable of the program will be a acoustical imaging camera having high spatial resolution (<1 degree) and excellent uniformity (<1 % overall sensitivity variation). A compelling DoD application of this camera is the imaging of bottom-moored mines in turbid littoral water, which will be demonstrated during the last year of the program in conjunction with the Navy.	$22M	BAA 97-33 Proposals due 10/31/97 Total program: 3 years	Dr. Elliot R. Brown ETO
Advanced Lithography: The objective of the DARPA Advanced Lithography Program is to revolutionize and accelerate the availability of lithography technologies for future semiconductor generations (i.e., < 100 nm feature sizes over fields of >1100 sq. mm.). Technology approaches that eliminate the need for masks are of greatest interest. Also of interest are technologies that simplify processes or provide new approaches to fabrication of three-dimensional microstructures. Innovative solutions to metrology, inspection and repair, image control and placement, sources, and lithographic tool subsystems are solicited. In the long term, approaches should be compatible with cost-effective semiconductor manufacturing. Technical areas include: maskless patterning, innovative masked patterning, imaging materials, three-dimensional microstructures, resistless processing, and associated technologies (i.e., metrology, nanoprobe control and sensing, inspection, new approaches to image control and placement, sources and subsystems for lithographic tools, etc.).	$5M	BAA 97-37 Proposals Due 11/24/97 Total program: 2-4 years	Dr. David Patterson ETO

DEFENSE ADVANCED RESEARCH PROJECTS AGENCY
INFORMATION TECHNOLOGY OFFICE (ITO)
PLANNED PROCUREMENTS
October 1997

PROGRAM DESCRIPTION	FUNDING	SCHEDULE	PROGRAM MGR
Global Mobile (GloMo) Information Systems: The GloMo program will enable mobile users to access and utilize the full range of services available in the Defense Information Infrastructure. To achieve this goal, the program will develop and integrate technologies and techniques at the applications, networking, and wireless link/node levels.	$10M	BAA 1QFY98 Total program: 3 years	Mr. Robert J. Ruth ITO
Next Generation Internet (NGI): NGI is an initiative by the Administration to develop the technologies to enable more powerful and versatile networks of the 21st century. The goal will be to: (1) develop the ultra-high-speed switching and transmission technologies, and demonstrate end-to-end network connectivity at 1+ Gb/s involving multiple NGI sites and applications; (2) develop and demonstrate advanced network management and control, and guaranteed quality-of-service; and (3) facilitate new applications.	$40M	BAA 1QFY98 Total program: 3 years	Dr. Bertram Hui ITO
UltraScale Computing: This program will identify and probe new classes of computing technologies which may offer spectacular performance/cost/size/weight/power improvements beyond the ultimate limitations of today's semiconductor-based computing.	$10M	BAA 1QFY98 Total program: 3-4 years	Mr. E. D. Maynard ITO
Active Nets: This program will focus on high-speed and secure implementations of active network switches and routers. "Paradigm breaking" services that offer significant new capabilities via active nets technology are also of interest.	$10M	BAA 1QFY98 Total program: 3-4 years	Ms. Hilarie Orman ITO

PROGRAM DESCRIPTION	FUNDING	SCHEDULE	PROGRAM MGR
Adaptive Computing Systems (ACS): The technology focus for this program is on higher order development environments for ACS: exploitation of fault-tolerant capabilities of ACS devices; vendor-neutral representations of intermediate data used to represent circuitry; and order of magnitude reduction in compilation times.	$25M	BAA 97-46 Proposals due 10/28/97 Total program: 3-4 years	Dr. Jose L. Munoz ITO
Information Survivability: The technology focus of the program is to isolate and repel malicious and suspicious activity in mission-critical systems, and technologies to allow the system to tolerate attack and to continue to operate correctly. The program also focuses on evaluation metrics for security and survivability applied to demonstrate such technologies in testbeds subject to red team attack.	$7M	BAA 1QFY98 Total program: 3-4 years	Ms. Teresa Lunt ITO

DEFENSE ADVANCED RESEARCH PROJECTS AGENCY
INFORMATION SYSTEMS OFFICE (ISO)
PLANNED PROCUREMENTS
October 1997

PROGRAM DESCRIPTION	FUNDING	SCHEDULE	PROGRAM MGR
Airborne Communications Node (ACN): The ACN goal is to design, develop, fabricate, test and demonstrate an Airborne Communications Node as a payload deployed onboard the Global Hawk High Altitude Endurance (HAE) Unmanned Aerial Vehicle (UAV) and an alternate platform utilizing advanced technologies now under development by DARPA. The primary program objective is to deliver a payload capability for a unit flyaway cost of $5M. The ACN will provide the capability to establish an early robust communications infrastructure for intra-theater communications without the need for large in-theater assets, while simultaneously providing reachback connectivity to out-of-theater sites. In addition to rapid deployment, the ACN will enable rapid in-flight reconfiguration of communications resources to match the requirements of military operations, including pre-hostilities, enroute and early entry, sustained operations and redeployment phases.	$35M	BAA 1QFY98 Total program: 4 years	COL Roy Edwards ISO

PROGRAM DESCRIPTION	FUNDING	SCHEDULE	PROGRAM MGR
Command Post of the Future: The objective is to provide the commander and his staff with an environment that will expand their cognitive processes, while enhancing their ability to make decisions and direct their execution. The system will provide a means to rapidly visualize, interpret, integrate and analyze information about the battlespace, while decreasing the uncertainties, unknowns, and the fragmented pictures of the battlespace. In order to facilitate this visualization we will develop/ integrate advanced concepts in human computer interaction technologies; interactive 3D visualization techniques; uncertainty presentation, temporal presentation natural language processing, and knowledge base querying technologies; collaborative planning, teleconferencing, shared map planning and electronic white boards. The development and integration of these technologies will be in conjunction with operational units from the USMC and Navy with a force size of 3,500, and an Army brigade with a force size of 1,100 supporting a corps with force size of 70,000.	$50M	BAA 2QFY98 Total program: 5 years	Mr. Dave Gunning ISO
Information Assurance (IA) Program: The goal of the Information Assurance Program is to develop security and survivability solutions for the Defense Information Infrastructure Leading Edge Services (DII LES). Within the framework of the Advanced Information Technology Services Reference Architecture (AITS), the Information Assurance Program is developing a security architecture that will ultimately serve all programs in the DII LES environment. The program is developing and refining information security technology that is to be integrated with Commercial-off-the-Shelf technology. The technologies will be integrated into and tested within the AITS Reference Architecture and testbed. The resulting security framework will reduce information vulnerability, allow increased interoperability and functionality, and provide the operational commander greater assurance that he will have the information he needs, when he needs it. Key to IA Program success is sound systems engineering and integration. Innovative technology and integration approaches are sought.	$20M $10M	BAA 97-11 Open through 12/31/97 BAA 3QFY98	Mr. Sami Saydjari ISO Mr. Sami Saydjari ISO

PROGRAM DESCRIPTION	FUNDING	SCHEDULE	PROGRAM MGR
Agent-Based Systems: Agent technology promises to lead to a revolutionary new model of computing beyond mainframe and client-server architectures. This new model will consist of entities that are autonomous, adaptable, and cooperative. It will result in computing systems that are dramatically easier to use, as well as systems that are self-configuring, self-healing, and evolvable. Although intelligent agent technology is already appearing in commercial products, significant research and development remains to be accomplished before the true benefits of agent-based systems, including enhanced productivity and increased military capability, can be realized. Control strategies do not exist that prevent a large heterogeneous set of agents from exhibiting dangerous or chaotic behavior on a network. ABS Program goals include the development of: (1) effective control strategies for large agent-based systems; (2) standard software architectures and other technologies necessary to implement those strategies; (3) advanced agent capabilities; and (4) agent-based solutions demonstrated on military problems. Technologies of interest are those that directly support effective multi-agent systems including agent languages, communication protocols, security mechanisms, coordination and control strategies, and component capabilities. Component capabilities, required for attaining intelligent, autonomous behavior from an agent or set of agents, include, but are not limited to artificial-intelligence-based techniques such as planning, scheduling, execution monitoring, communicating, and reacting.	$55M	BAA 1QFY98 Total program: 5 years	Maj Doug Dyer ISO

PROGRAM DESCRIPTION	FUNDING	SCHEDULE	PROGRAM MGR
Multi-Spectral Exploitation Testbed: The increased utility of computer-assisted exploitation of microwave synthetic aperture radar (SAR) images has been demonstrated on the Semi-Automated IMINT Processing (SAIP) ACTD. There is a strong need to extend this capability to include other image intelligence sensors including: multispectral imagery, hyperspectral sensors, and foliage penetration SAR. The objective of this program is to build on the SAIP architecture to obtain the following: (1) improved human computer interface for exploitation and interpretation of multispectral images; (2) geolocation and rectification of images from several platforms with different spatial and spectral resolutions; (3) semi-automated target detection and cueing between spectral bands to enhance target classification; and (4) interoperability with Common Integrated Ground/Surface System datalink and image exploitation architecture. The results will be demonstrated with operational user exercises against tactical targets to validate projections of image exploitation effectiveness.	$10M	BAA 3QFY98 Total program: 1-3 years	Dr. Mark Davis ISO

PROGRAM DESCRIPTION	FUNDING	SCHEDULE	PROGRAM MGR
Advanced Cooperative Collection Management (AACM): The goal of the ACCM program is to develop and transition technologies that advance the state of the art in collection management by enabling the Intelligence, Surveillance, and Reconnaissance (ISR) confederation to operate in a time-compressed, cooperative-collection capacity necessary for synergistic collections, time-critical targeting, and dynamic battlefield awareness. The ACCM program will benefit the warfighter by providing automated and semi-automated collection management capabilities in the areas of information management, strategy development, and multi-asset synchronization. Together, these capabilities will assure near-real time information support to the joint forces commander and the tight integration of the ISR management process with operational requirements. ACCM technology enhancements will enable: (1) coordinated dynamic "strategy-to-task" alignment of collection and operational plans; (2) dynamic cross-cueing of assets while retaining 85% of preplanned tasks; (3) continuous feedback to information requestors on the probability of ISR collection support; and (4) order of magnitude reduction in the timelines for strategy development and coordination of synchronized collections by multiple assets for cross-mission precision geolocation.	$35M	BAA 97-05-PKPX OPEN through 9/30/2001 Total program: 3-5 years	CDR Carol Thompson ISO

PROGRAM DESCRIPTION	FUNDING	SCHEDULE	PROGRAM MGR
JFACC Program: The JFACC program will revolutionize command and control of joint and coalition air forces though the incremental development, integration, evaluation, demonstration, and transition of advanced information technologies and systems which will enable new air operations planning, execution and assessment concepts of operations. It will transform air operations planning capabilities from a reactive, sequential system to one providing continuous, near-real-time predictive planning, visually oriented, distributed, collaborative decision support, and rapid response to dynamic situations. Specific technical challenges being addressed by the program include: (1) advanced knowledge representations integrating all elements of the Air Operations domain (objectives, tasks, activities, strategies, tactics, priorities, intelligence, and campaign status); (2) a scaleable architecture of planning, execution, and assessment software agents that provide continuous and interleaved cross functional decision support in dynamic and unpredictable environments; (3) a flexible modeling and analysis framework and components for rapid battlespace characterization, center-of-gravity analysis, strategy formulation, course of action through mission pre-play evaluation; and (4) integrated visualization, collaboration and workflow management services that provide a seemless user environment for distributed teams and agents performing collective work.	$100+M total program	BAA 3QFY98 Total program: Currently in year 2 of 5	Col Bob Plebanek ISO

PROGRAM DESCRIPTION	FUNDING	SCHEDULE	PROGRAM MGR
Dynamic Database (DDB): As the number of sensors, platforms, exploitation sites, and command and control nodes continues to grow in response to Joint Vision 2010 requirements, commanders and analysts increasingly require the ability to rapidly sift through massive volumes of sensor data over wide areas to assess both friendly and enemy situations. Complicating this problem is the fact that current military situation assessment systems exploit only a fraction of all available multi-sensor data, and are unable to maintain a spatio-temporal history of the battlespace suitable for detecting tactically significant patterns and events. Additionally, today's situation estimates are produced by disjointed, labor-intensive systems that react slowly and asynchronously to rapidly changing terrain, environment, and operational conditions. The overarching goal of the DDB program is to address these needs by efficiently producing and continuously updating a dynamic situation estimate of the evolving battlespace using all available sensor resources. This goal will be met by designing, building, and demonstrating a battlespace awareness information system that: (1) efficiently stores essential battlespace information and provides ready access to all battlespace sensor observations collected over time; (2) uses the resulting sensor history to identify and focus users' attention on tactically significant battlespace events; and (3) shares and synchronizes local situation estimates across the distributed battlespace.	$75M	BAA 97-45 Proposals due 12/15/97 Total program: 3 years	Maj Tom Burns ISO

PROGRAM DESCRIPTION	FUNDING	SCHEDULE	PROGRAM MGR
Advanced Logistics Program (ALP) and Joint Logistics Advanced Concept Technology Demonstration (JL ACTD): DARPA is pursuing the development of technologies to enhance the readiness of our military forces through a quantum improvement in military logistics. The ALP focuses on technology development; the JL ACTD focuses on technology insertion. The objective of the ALP, jointly sponsored with the Defense Logistics Agency, is to develop and demonstrate advanced technologies, software tools, and protocols necessary to realize efficient and effective real-time control of the logistics pipeline. Efforts focus on technologies that directly support the automation of logistics planning, execution monitoring, and replanning processes. The JL ACTD is a three-phased initiative intended to provide an experimental environment where logisticians can evaluate maturing joint logistics decision support tools and technologies, and to determine their worth for increased operational capability. Phase I developed the Logistics Anchor Desk which was declared complete in April 1997. Phase II will focus on migrating critically needed decision support tool functionality from the Logistics Anchor Desk to the Global Combat Support System (GCSS) web-based environment and development and fielding of new joint logistics decision support tools that satisfy joint operational requirements. Phase III will provide a migration path for evaluating and fielding advanced technologies such as those developed by the ALP.	$15M	BAA 97-32 Proposals due 7/7/98 Total program: 3-5 years	Mr. Brian Sharkey ISO

DEFENSE ADVANCED RESEARCH PROJECTS AGENCY
TACTICAL TECHNOLOGY OFFICE (TTO)
PLANNED PROCUREMENTS
October 1997

PROGRAM DESCRIPTION	FUNDING	SCHEDULE	PROGRAM MGR
Advanced Micro-Internetted Unattended Sensors Program: This program will develop and demonstrate low-power, miniature, internetted, unattended sensors that can be hand-emplaced or delivered singularly or in submunition-sized packages by projectiles, mortars or missiles, such as 20mm, 40mm, 60mm, MLRS or ATACMS. This effort will build on ongoing unattended sensor technology development efforts presently being funded, but will focus on are less than 1-inch in diameter by 1- inch long. Sensors of primary interest include chemical, imaging miniature, low-power, integrated sensor signal processing and communication packages that (visual and infrared), seismic, magnetic, acoustic and weather for both land and marine littoral applications. Efficient signal processing, classification, tracking and data fusion algorithms, for very low power sensor applications, are also of interest.	$5M	BAA 1QFY98 Total program: 3-4 years	Dr. E. Carapezza TTO
Adaptive Spectral Reconnaissance: The Adaptive Spectral Reconnaissance Program seeks to develop, integrate, and test a day/night reconnaissance/surveillance system which will provide a wide-area search capability to mid-altitude platforms. This system will use a multi- or hyperspectral sensor to provide cues of probable targets which are then imaged by a high spatial resolution sensor. The system will include real-time processing of the spectral data to identify target cues. Anticipated technical challenges include: (1) development of high performance spectral sensors suited to the applications, particularly in the thermal infrared; (2) on-board real-time processing of spectral data yielding target cues at a false alarm rate consistent with the system constraints; and (3) accurate target hand-off to a high spatial resolution sensor. Two competitive solicitations are anticipated, one for a system study to assist in the system definition, a second for the development and integration of the full system onto a medium altitude endurance UAV, but program details have yet to be finalized.	$1M $15M	BAA System Study 1QFY98 1 year RFP System Development 3QFY98 2 years	Dr. David Fields TTO

PROGRAM DESCRIPTION	FUNDING	SCHEDULE	PROGRAM MGR
Advanced Fire Support System: This program will develop a weapon and launcher system to demonstrate a concept for platform independent weapons for future Army applications. Current versions of the concept include a self-locating, containerized, vertical-launch system for multipurpose precision missiles. The missiles are modular, and can accept different warheads and seekers. The missiles may be capable of in-flight targeting updates. On the launcher, the fire control system is a removable, self-contained package which can be commanded via radio frequency, electronic, or fiber optic communications. In addition to sound system engineering, the program seeks to develop innovative concepts at the subsystem level, including seekers, propulsion, and guidance and control. This program will be managed in multiple phases. Multiple awards are anticipated, though not all may complete full system development. Phase I will be concept definition, detailed design, component and risk-reduction testing, potentially followed by Phase II, full development and testing.	$10M	BAA 1QFY98 Phase I: 2 years Potential Ph II: 2 years	Dr. David Fields TTO
Tactical Mobile Robotics: The objective of this effort is to enable land warfighters to dominate battlespaces using teams of mobile robots operating in complex terrain, with particular attention to urban environments. The program consists in the first two years of technology development and system design, and concentrates in the second two years on system integration and demonstration. Technology development will focus on machine perception, autonomous operation, and robotic locomotion. System demonstration will concentrate on selected urban warfare applications, such as urban assault, urban reconnaissance, and building clearing.	$40M	BAA 1QFY98 Total program: 4 years	Dr. Eric Krotkov TTO

PROGRAM DESCRIPTION	FUNDING	SCHEDULE	PROGRAM MGR
Communications and Situation Awareness Enabling Technology Program: The overall objective of the SUO Communications and Situation Awareness Enabling Technology Program is the development and demonstration of enabling technologies in the area of tactical communications and situation awareness. These technologies are not expected to be total communications or situation awareness systems, but rather, highly innovative, discrete technologies that, when integrated with other technologies by a separate integration and development contractor, could result in revolutionary improvements in soldier communications and situation awareness. These discrete technologies would contribute to an envisioned future situation awareness system that would maintain continuous data communications between multiple dismounted maneuvering warfighters that are dispersed in highly restrictive environments (built up urban, mountainous or heavily forested areas) scenarios over an operating area of at least 200 km by 200 km and in all types of weather.	$16M	BAA 97-14 OPEN through 12/31/97 Total program: 2-3 years	Dr. Mark McHenry TTO

PROGRAM DESCRIPTION	FUNDING	SCHEDULE	PROGRAM MGR
Advanced Tactical Targeting Technology (AT3): This program will demonstrate a passive tactical targeting system for the lethal suppression of enemy air defenses (SEAD). Today's threat radar targeting systems employed for SEAD fail to provide the rapid and accurate emitter geolocation needed to replace dedicated anti-radiation missiles (ARM) with generic, shoot-to-coordinate, smart weapons (e.g., JDAM or JSOW). The targeting system must negate emitter shutdown tactics now employed to defeat ARM guidance and enable simplified ordnance inventories. Generation and distribution of near real-time (e.g., seconds), comprehensive, and highly precise location of threat radars to all theater combatant aircraft is required without deploying any extra, SEAD-dedicated, emitter collecting platforms. AT3 will accomplish this by widely deploying emitter collection packages hosted on existing airborne platforms, including combatant aircraft. AT3 will integrate (fuse) in real-time the distributed multi-platform emitter collections using existing or planned tactical (narrowband) radios with advanced networked management (data packets) and signal processing. Additionally, to achieve the necessary wide deployment, AT3 self-contained collection packages must impose negligible burden on their airborne hosts and be available at affordable prices. Enabling technologies now in development at DARPA will be used in AT3. These technologies include highly agile digital receivers packaged in multichip modules, highly precise tactical clocks, tightly coupled integrated GPS/INS packages, and advanced, highly dynamic data fusion network management capabilities. Critical system advancements are: (1) generating the commonly registered, theater-wide absolute doppler corrections to collected data; and (2) managing the extraordinarily dynamic real-time data network, including individual user kinematics and a changing aggregate participating user population.	$35M	RFP 1QFY98 Phase 1a FY98-99 Phase 1b FY 99-01	Lt Col Beth Kaspar TTO
Robotics for Urban Terrain, Phase III: This program builds upon the technology developed from Phases I & II. The objective of this effort is to develop a prototype robot that can perform the tasks of a "pointman" and combat engineer, minimizing the risks for human infantry personnel. These tasks would include emplacing explosive charges, clearing rooms with grenades (real, concussion and/or smoke), thereby facilitating warfighter entry into building.	$15M	BAA 3QFY99 Phase III: 2 years	Dr. Eric Krotkov TTO

PROGRAM DESCRIPTION	FUNDING	SCHEDULE	PROGRAM MGR
MARITECH: The objective of the MARITECH Program is to develop technologies that will improve the US shipbuilding industry's competitiveness in international commercial markets and facilitate more affordable construction of Navy ships. The ability for US shipyards to successfully compete in the international, commercial marketplace is critical if we are to preserve the US shipbuilding industrial base during this downturn in military ship construction. An equally important benefit is that competitive commercial shipbuilding practices can be applied for more efficient and affordable Navy ship construction. The MARITECH program will change the culture of the US shipbuilding industry from its past focus on military ship construction with that market's attendant inefficiencies to a highly competitive commercial ship supplier through the development of international commercial ship designs, process rationalization and advanced shipyard management, design and construction technologies. The FY98 MARITECH Program will focus on national level projects which involve horizontally integrated consortia looking to technologically improve the US shipbuilding community. FY98 is the last year of this program.	$5M	BAA 1QFY98	Mr. Robert Schaffran TTO

PROGRAM DESCRIPTION	FUNDING	SCHEDULE	PROGRAM MGR
Affordable Rapid Response Missile Demonstrator (ARRMD): The objective of the ARRMD program is to build and demonstrate *in flight* an affordable Mach 6-8, scramjet-powered, hydrocarbon-fueled missile for conduct of rapid-response, long-range missions against time-critical (2-8 min, 100-600 nmi) targets. In addition, a high-speed missile would enable nano-layer structured penetrators to take advantage of much higher impact velocities for the defeat of hard and deeply buried targets. Specific program goals include: (1) demonstrate affordable manufacturing processes to enable hypersonic missile production at an average unit flyaway price of $200K; (2) develop a concept of operations with the user for a high-speed missile; (3) demonstrate aeropropulsion performance of a high-speed missile launch platform compatibility with tactical aircraft *and* the Navy's Vertical Launching System; and (4) achieve Mach 6-8 cruise with an overall range of 400 - 600 nmi. The program has been designed as a two-phased program to enable risk reduction associated with demonstrating that hypersonic missile technologies can be delivered *affordably*. In the first phase, two contractors will design a high-speed flight vehicle, perform manufacturability demonstrations, conduct propulsion integrated flow path demonstrations, and perform flight test planning. In addition, an independent affordability assessment and warfighting payoff assessment will be performed. The affordability assessment will provide insight and confidence in the ability of industry to achieve a $200K average unit flyaway production price. The warfighting payoff assessment will lay the groundwork for establishing military utility of a hypersonic missile. Phase 2 may follow successful completion of Phase 1, through a contract option to assemble flight vehicle(s) and conduct flight demonstration testing.	$10M (Ph 1) $50M (Ph 2)	BAA 1QFY98 Exercise option for Phase 2 Total program: 3-4 years	Lt Col Walt Price TTO

PROGRAM DESCRIPTION	FUNDING	SCHEDULE	PROGRAM MGR
Situation Awareness System: The Situation Awareness System (SAS) will provide tactical level, real-time, essential information and communications, scaleable from the individual soldier to the battalion, operating in urban, forested and mountainous environments. Products to be developed include: multimode, programmable, digital, network/voice communications with precise (3m) geolocation, scaleable situation awareness, collaborative planning, tasking and control in a hand-held, lightweight (<1.0kg excluding batteries), low power (<5W) and low cost (<$5K DTUPC @10,000 units) device. The SAS will consist of: low power consumption computer; direct P/Y GPS and a non-GPS geolocation device; high stability clocks; programmable, broadband network radio; offboard sensor interface; local team-sharing network; attritable ground relays, airborne relays, and ground mobile relays; battalion workstation and communication interface, Situation Awareness/Planning/Tasking/ Analysis/Network Software. The SAS will provide voice, data, alerts and video/graphics via tactical communications modes over 2 MHz to 2 GHz, including a highly dependable lifeline mode that ensures connectivity for critical mission functions in severely restrictive environments. An integrated processor will support intelligent, just-in-time, application software retrieval, collaborative planning, sensor tasking and control features. Distributed, interactive hubs will monitor and automatically update data, alerts and warnings in a collaborative environment providing a moving bubble of the battlespace (8-30 km radius providing 8-10 minute warning time) to teams subordinate to the battalion. Phase 1 (solicitation completed) develops the system architecture and preliminary specifications; Phase 2 develops preliminary design and the individual segment specifications; Phase 3 entails the design, fabrication, test and demonstration of the SAS.	$40M (Total funding through FY99)	BAA Phase 2 2QFY98 Down select for Phase 3 3QFY99	Dr. Mark McHenry TTO

DEFENSE ADVANCED RESEARCH PROJECTS AGENCY
SENSOR TECHNOLOGY OFFICE (STO)
PLANNED PROCUREMENTS
October 1997

PROGRAM DESCRIPTION	FUNDING	SCHEDULE	PROGRAM MGR
Low Cost Cruise Missile Defense - Seeker Technologies: The Low-Cost Cruise Missile Defense (LCCMD) program is exploring weapon system concepts and component technologies which may allow for an effective counter against a proliferated, "low-tech" cruise missile threat at a substantially reduced cost. One of the significant cost drivers in current air defense architectures is interceptor guidance and control cost. These costs are dominated by interceptor seeker costs, which can be up to 65% of the total cost of the weapon. The LCCMD program is exploring innovative, low-cost seeker technologies which may enable a substantial reduction in interceptor cost. An example is the MEMS-based electronically scanned array seeker which leverages emerging low-cost, light-weight, low-power, low-loss MEMS phase shifters to reduce seeker complexity and cost versus a conventional ESA approach. This effort will look for new seeker concepts which apply innovative technologies to substantially reduce seeker costs. These concepts should be capable of countering the LCCMD threat and/or other asymmetric threats such as UAV weapons and ground-based/UAV jammers.	$1M	BAA 1QFY98 Total program: 1-2 years	LTC William Johnson STO